Continuous Learning and Sharing System

(Class)

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U.S. Department of Energy contractors are required to incorporate lessons learned into their planning processes. Further, contractors are expected to identify and capture efficiencies, new technologies, and tribal knowledge. A lot of this type of information does not conform or fit into a formal Lessons Learned format. Anticipating "Knowledge Management", Shaw Environmental, Inc. wanted an information exchange system which would not only capture local lessons learned, but also compile program information and technology. In other words, a system where employees could find answers and share new ideas. This presentation describes some of the problems faced in developing the new system, Shaw Environmental, Inc.'s analysis of the problems, and finally the resultant solutions to those problems.

Problems

Some of the problems with the existing systems include:

- Applicability - A number of the national lessons are not applicable to our work.

- Consistency - All Shaw Environmental, Inc. projects conduct lessons learned debriefs; however, there is no consistency in content or format.

- Utilization - There is no way to verify that information is being accessed and incorporated into daily activities.

- Tracking and Trending - There is no method in place for tracking or trending local lessons.

- Performance Measures - There were no performance measures, either locally or on a national basis, to evaluate success or usage.

- Information Retrieval - It is difficult and time consuming for personnel to retrieve local information. Each post-project debrief is filed in an Outlook folder. Personnel have to read each document posted to find applicable lessons.

Approach

A mechanism was needed which would allow the data to be input in a format that could be retrieved, manipulated, and mined. The system had to be easy to use and serve multiple purposes. Working with an Information Technology Specialist, a web-based application was developed to address the aforementioned constraints and be flexible enough to meet any future requirements. The approach and development of the application are delineated in the following sections.

Training

In order to develop a viable system, the Information Technology Specialist was inculcated into the lessons learned process and requirements. This was accomplished by having the individual attend national lessons learned meetings, which were attended by contractors and government representatives from across the country. The global information gained from these meetings was augmented by providing one-on-one instruction specific to our organization.

User Groups

The second step was to define what the application was to accomplish. To develop a user defined database, all potential user groups were contacted and asked to identify representatives to participate in several development meetings. At the meetings, the representatives were given the objectives of the application and, through brain storming, the criteria for the database was identified.

One of the issues the committee identified early in the process involved the name of the database. User representatives wanted the new system to be more comprehensive and serve a broader purpose. They wanted it to be an information exchange rather than just another lessons learned vehicle.

CLASS

As a result, the new system was named the Continuous Learning and Sharing System (CLASS). While CLASS includes lessons learned, it was actually developed to be an information exchange system that is a comprehensive compilation of data and technology. It can be accessed by all Shaw Environmental, Inc. employees to improve performance, find answers to problems, and/or share new ideas. This database is designed to capture project lessons, tribal knowledge, and innovative ideas. The format is user friendly, the data is organized in a manner that allows for ease of use in the areas of inputs, reports, searches, and allows for information to be incorporated into planning documents and meetings.
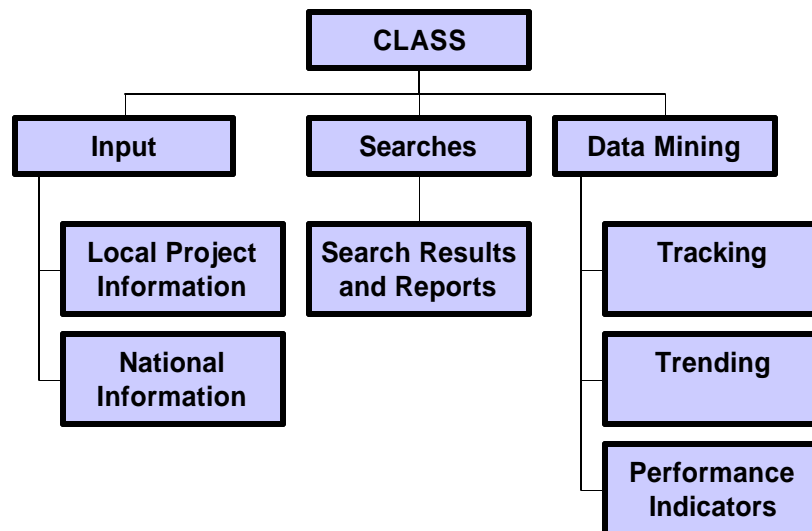
Core Concepts

The criteria defined by the user representatives included some basic core concepts. The system had to be easy to use and complementary to current processes. Users did not want to substantially change the way they were already conducting activities. Data had to be easily retrievable and presented in a manner that facilitated its use. Finally, the system needed to demonstrate that information was being incorporated into activities.

Phases of Development

In order to make the system development more manageable, and to maintain focus, the process was broken down into three phases, as shown on the Structure Chart below:

Continuous Learning and Sharing System (CLASS)

Structure Chart

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                          CLASS
        ┌───────────────────┼───────────────────┐
      Input             Searches           Data Mining
        │                   │                   │
  Local Project       Search Results        Tracking
  Information         and Reports
                                            Trending
  National
  Information                               Performance
                                            Indicators
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Phase One

The Input phase involved identifying the criteria the database must satisfy and designing the database, choosing the web interface logic, and verifying and processing of the design. As mentioned previously,

numerous preparatory meetings were conducted to determine client and user criteria. It was decided that a web-based system would provide the greatest capabilities. Therefore, the database was developed using the SQL Server 8 database engine and Cold Fusion 4.5 was used for the web-interface pages. The system uses Crystal Reports 8 report viewer. It also has Java script features and uses network authentication. Some of the features include the following:

- Spell Check
- Search Capabilities
- Data Verification
- Comments - Feedback Loop
- Automatic E-mail Notification
- Help Text
- File/picture Attachment Capabilities
- Statistical Tracking

Initially, historical data was identified, captured, and input into the database. Subsequently, a limited number of project personnel are testing the system by inputting data under two conditions: post-project in the office and real-time input in the field. The benefit of inputting lessons in the field are two-fold, if lessons are identified and captured as they occur, there is less likelihood of information being lost. Further, identified lessons can be used in the daily field safety briefings. Real time input also eliminates redundant data entry.

In addition, applicable nationwide lessons will be summarized and put into the database, with a link to the national database in the event the user desires more information. These national lessons will be coded to prevent inclusion in any local trending reports or performance indicators.

Finally, this phase consists of generating project lessons learned activity reports for the project files. Traditionally, the post-project lessons learned minutes, or reports, came in all shapes and sizes. Project personnel had no guidance as to the format. This system provides both structure and consistency.

Phase Two

Phase two involves retrieving information. Search parameters were developed and the search features of the database were created. The database can be searched a variety of ways including the use of categories, ratings, titles, dates, and a text search. By building in this flexibility, users can easily

generate customized reports based on search results.

A mechanism was also created so that each piece of information returned in a search will have a comment section. If the individual searching has a comment, solution, or better way of dealing with the stated problem, that information can be added to the comment block of the original activity. An automatic message will be sent to the author of the original entry notifying him or her that a comment has been added.

Phase Three

Phase three involves developing and incorporating performance indicators, such as how much data is being added, how often the database is being accessed, who is accessing the data, the number of times the search feature of the application is accessed, and the number of times items are downloaded, to name a few. This phase also involves the manipulation of data; defining the criteria and developing the parameters needed for trend reports, cost benefit analysis, and various other reports that will demonstrate program improvement, efficiencies, utilization, and cost savings.

Results

Development of the CLASS information exchange system has taken over a year and phase three is still under construction. However, as a result of extensive planning and user input, the application is a well thought out system. User response has been very favorable and has produced valuable feedback allowing adjustments to the system where necessary.

Future

The ultimate goal, after this database has been developed and seasoned, is to contact the Artificial Intelligence community to try to obtain a software program that will link the database with the programs being used to create planning documents (WordPerfect, Microsoft Word, Framemaker). The objective is to make the system an active one that is brought right to the author's desktop.

The software would work in the background of these programs and continually search the database for information concerning a subject the author is writing about. If information exists in the database, the author would be cued with a flashing, or different color word, or a small icon. By clicking on the word or icon, the author will be able to pull up summaries of all activities or lessons pertaining to that subject. For more information the author will be able to click on an activity and read the details.